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Methods and Apparatus for Transcoding)
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)
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AMENDMENT UNDER PCT ARTICLE 19

International Bureau of WIPO
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1211 Geneva 20
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Dear Sir:

Transmitted herewith are twenty-four substitute sheets, pages 35-58 of the above-referenced international application, which have been amended pursuant to Article 19 of the Patent Cooperation Treaty.

Statement under Article 19(1)

According to the amendments, claims 1-90 have been cancelled and new claims 1-112 (pages 35-57) have been substituted therefor. In addition, a substitute abstract page with the correct new page number (page 58) is submitted herewith.

10/540611

PATENT

20004/67-WO

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Support for these amendments may be found throughout the above-referenced

international application. No new matter has been included.

Entry of the foregoing amendments is respectfully requested.

Respectfully submitted,

Nielsen Media Research, Inc.

Dated: MARCH 17, 2004

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What is claimed is:

1. A method for transcoding a media signal comprising:
extracting metadata from the media signal to form extracted metadata; and
converting the extracted metadata from a first media format associated with a first media consumption device to a second media format associated with a second media consumption device to form converted media information, wherein the first media consumption device and the second media consumption device are configurable to be communicatively coupled to a network.
2. A method as defined in claim 1, further comprising converting media content associated with the media signal from a third media format to a fourth media format to form the converted media information.
3. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises identifying at least one of the first media format and second media format prior to converting the extracted metadata.
4. A method as defined in claim 3, wherein identifying the at least one of the first media format and the second media format comprises identifying a media format detectable by a metering device associated with the second media consumption device.
5. A method as defined in claim 4, wherein identifying the media format detectable by the metering device comprises identifying at least one of an audio

watermark sensor, a video watermark sensor, a digital bitstream sensor, a database sensor, and a software sensor associated with the metering device.

6. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises:

- detecting a watermark associated with the media signal;
- identifying a signal compression ratio associated with the watermark; and
- modifying the signal compression ratio based on the second media format.

7. A method as defined in claim 6, wherein modifying the signal compression ratio based on the second media format comprises comparing an output bit rate associated with the signal compression ratio to a network bit rate associated with the network.

8. A method as defined in claim 6, wherein modifying the signal compression ratio based on the second media format comprises changing an output bit rate based on a network bit rate associated with the network.

9. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises:

- generating a watermark based on the second media format; and
- inserting the watermark in the converted media information.

10. A method as defined in claim 9 further comprising providing correlation information associated with the watermark and the converted media information to at least one of a data measurement collection device and a data collection facility.
11. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises:
- encoding the extracted metadata in the second media format; and
 - digitally inserting encoded metadata into a bitstream associated with the converted media information.
12. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises converting the extracted metadata to cause converted media content to be stored in a database.
13. A method as defined in claim 1, wherein converting the extracted metadata from the first media format to the second media format to form the converted media information comprises converting the extracted metadata to cause converted metadata to be extracted from the second media consumption device based on an application program interface associated with the second media consumption device.
14. A method as defined in claim 1, wherein extracting the metadata from the media signal comprises demultiplexing the media signal.

15. A method as defined in claim 1 further comprising generating a converted media signal having the converted media information, wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

16. A method as defined in claim 1 further comprising transmitting a converted media signal having the converted media information to at least one of the second media consumption device and a metering device associated with the second consumption media device, wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

17. A method as defined in claim 1, further comprising monitoring media consumption based on the converted media information.

18. A method as defined in claim 1, wherein the metadata comprises at least one of content identification information, source identification information, destination device identification information, distribution channel identification information, timestamps associated with at least one of creation and generation of media content, and information associated with the media signal.

19. A method as defined in claim 18, wherein the information associated with the media signal comprises at least one of frequency information, format information, signal strength information, bit rate information, frame rate information, and sampling frequency information.

20. A method as defined in claim 1, wherein at least one of the first media consumption device and the second media consumption device is one of a television, a radio, a personal computer, a personal digital assistant, a telephone, a digital video disk player, and a personal video recorder.

21. A method as defined in claim 1, wherein the network comprises at least one of a wired network and a wireless network.

22. A method as defined in claim 1, wherein the network comprises at least one of a server, a database, and a data measurement collection device.

23. A method as defined in claim 1, wherein the network comprises a home network.

24. An apparatus for transcoding a media signal comprising:
a network interface to communicate the media signal between a first media consumption device and a second media consumption device configurable to be communicatively coupled to a network;
an extracting device coupled to the network interface and configured to extract metadata from the media signal to form extracted metadata; and
an encoding device coupled to the network interface and configured to convert the extracted metadata from a first media format associated with the first media consumption device to a second media format associated with the second media consumption device to form converted media information.

25. An apparatus as defined in claim 24, wherein the encoding device is configured to convert media content associated with the media signal from a third media format to a fourth media format to form the converted media information.

26. An apparatus as defined in claim 24 further comprising an identification device coupled to the network interface and configured to identify at least one of the first media format and the second media format.

27. An apparatus as defined in claim 26, wherein the identification device is configured to identify a media format detectable by a metering device associated with the second media consumption device.

28. An apparatus as defined in claim 26, wherein the identification device is configured to identify at least one of an audio watermark sensor, a video watermark sensor, a digital bitstream sensor, a database sensor, and a software sensor associated with the metering device.

29. An apparatus as defined in claim 26, wherein the identification device is configured to detect a watermark associated with the media signal and to identify a signal compression ratio associated with the watermark, and wherein the encoding device is configured to modify the signal compression ratio based on the second media format.

30. An apparatus as defined in claim 29, wherein the encoding device is configured to compare an output bit rate associated with the signal compression ratio to a

network bit rate of the network and adjust the output bit rate based on the network bit rate.

31. An apparatus as defined in claim 26, wherein the identification device and the encoding device are integrated within a single device.

32. An apparatus as defined in claim 24 further comprising a watermark generator configured to generate a watermark based on the second media format and insert the watermark in the converted media information.

33. An apparatus as defined in claim 32, wherein the watermark generator is configured to provide correlation information associated with the watermark and the converted media information to at least one of a data measurement collection device and a data collection facility.

34. An apparatus as defined in claim 24, wherein the encoding device is configured to encode the metadata in the second media format and to digitally insert encoded metadata into a bitstream associated with the converted media information.

35. An apparatus as defined in claim 24, wherein the converted media information is configured to cause converted media content to be stored in a database.

36. An apparatus as defined in claim 24, wherein the converted media information is configured to cause converted metadata to be extracted from the second

media consumption device based on an application program interface associated with the second media consumption device.

37. An apparatus as defined in claim 24, wherein the encoding device is configured to generate a converted media signal having the converted media information, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

38. An apparatus as defined in claim 24, wherein the network interface is configured to transmit a converted media signal having the converted media information to at least one of the second media consumption device and a metering device associated with the second media consumption device, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

39. An apparatus as defined in claim 24, wherein the network interface is configured to receive the media signal from the first media consumption device.

40. An apparatus as defined in claim 24, wherein the extracting device comprises a demultiplexer.

41. An apparatus as defined in claim 24 further comprising a memory to store the media signal.

42. An apparatus as defined in claim 24, wherein the metadata comprises at least one of content identification information, source identification information, destination device identification information, distribution channel identification information, timestamps associated with at least one of creation and generation of media content, and information associated with the media signal.

43. An apparatus as defined in claim 42, wherein the information associated with the media signal comprises at least one of frequency information, format information, signal strength information, bit rate information, frame rate information, and sampling frequency information.

44. An apparatus as defined in claim 24, wherein at least one of the first media consumption device and the second media consumption device is one of a television, a radio, a personal computer, a personal digital assistant, a telephone, a digital video disk player, and a personal video recorder.

45. An apparatus as defined in claim 24, wherein the network comprises at least one of a wired network and a wireless network.

46. An apparatus as defined in claim 24, wherein network comprises at least one of a server, a database, and a data collection measurement device.

47. An apparatus as defined in claim 24 integrated with at least one of a set top box, the first media consumption device, the second media consumption device, and a

metering device associated with at least one of the first media consumption device and the second media consumption device.

48. An apparatus as defined in claim 24, wherein the network comprises a home network.

49. An apparatus as defined in claim 24, further comprising a metering device configured to monitor media consumption based on the converted media information.

50. A machine accessible medium having instructions stored thereon that when executed, cause a machine to:

extract metadata from a media signal to form extracted metadata; and

convert the extracted metadata from a first media format associated with a first media consumption device to a second media format associated with a second media consumption device to form converted media information, wherein the first media consumption device and the second media consumption device are configurable to be communicatively coupled to a network.

51. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert media content associated with the media signal from a third media format to a fourth media format to form the converted media information.

52. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to identify at least one of the first media format and the second media format prior to converting the extracted metadata.

53. A machine accessible medium as defined in claim 52, wherein the instructions, when executed, cause the machine to identify the at least one of the second media format by identifying a media format detectable by a metering device associated with the second media consumption device.

54. A machine accessible medium as defined in claim 53, wherein the instructions, when executed, cause the machine to identify the media format detectable by the metering device by identifying at least one of an audio watermark sensor, a video watermark sensor, a digital bitstream sensor, a database sensor, and a software sensor associated the metering device.

55. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert the extracted metadata from the first media format to the second media format to form the converted media information by:

- detecting a watermark associated with the media signal;
- identifying a signal compression ratio associated with the watermark; and
- modifying the signal compression ratio based on the second media format.

56. A machine accessible medium as defined in claim 55, wherein the instructions, when executed, cause the machine to modify the signal compression ratio

based on the second media format by comparing an output bit rate associated with the signal compression ratio to a network bit rate associated with the network.

57. A machine accessible medium as defined in claim 55, wherein the instructions, when executed, cause the machine to modify the signal compression ratio based on the second media format by changing an output bit rate based on a network bit rate associated with the network.

58. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert the extracted metadata from the first media format to the second media format to form the converted media information by:

generating a watermark based on the second media format; and
inserting the watermark in the converted media information.

59. A machine accessible medium as defined in claim 58, wherein the instructions, when executed, cause the machine to provide correlation information associated with the watermark and the converted media information to at least one of a data measurement collection device and a data collection facility.

60. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert the extracted metadata from the first media format to the second media format to form the converted media information by:

encoding the metadata in the second media format; and

digitally inserting encoded metadata into a bitstream associated with the converted media information.

61. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert the extracted metadata from the first media format to the second media format to form the converted media information by converting the extracted metadata to cause converted media content to be stored in a database.

62. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to convert the extracted metadata from the first media format to the second media format to form the converted media information by converting the extracted metadata to cause converted metadata to be extracted from the second media consumption device based on an application program interface associated with the second media consumption device.

63. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to extract the metadata from the media signal by demultiplexing the media signal.

64. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to generate a converted media signal having the converted media information, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

65. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to transmit a converted media signal having the converted media information to at least one of the second media consumption device and a metering device associated with the second media consumption device, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

66. A machine accessible medium as defined in claim 50, wherein the instructions, when executed, cause the machine to monitor media consumption based on the converted media information.

67. A machine accessible medium as defined in claim 50, wherein the metadata comprises at least one of content identification information, source identification information, destination device identification information, distribution channel identification information, timestamps associated with at least one of creation and generation of media content, and information associated with the media signal.

68. A machine accessible medium as defined in claim 67, wherein the information associated with the media signal comprises at least one of frequency information, format information, signal strength information, bit rate information, frame rate information, and sampling frequency information.

69. A machine accessible medium as defined in claim 50, wherein at least one of the first media consumption device and the second media consumption device is one of

a television, a radio, a personal computer, a personal digital assistant, a telephone, a digital video disk player, and a personal video recorder.

70. A machine accessible medium as defined in claim 50, wherein the network comprises at least one of a wired network and a wireless network.

71. A machine accessible medium as defined in claim 50, wherein the network comprises at least one of a server, a database, and a data measurement collection device.

72. A machine accessible medium as defined in claim 50, wherein the network comprises a home network.

73. A system for transcoding a media signal comprising:
a first media consumption device;
a second media consumption device communicatively coupled to the first media consumption device;
a metering device communicatively coupled to at least one of the first media consumption device and the second media consumption device; and
a transcoding device communicatively coupled to at least one of the first media consumption device, the second media consumption device, and the metering device, and configured to extract metadata from the media signal to form extracted metadata and convert the extracted metadata from a first media format associated with the first media consumption device to a second media format associated with the second media consumption device to form converted media information.

74. A system as defined in claim 73, wherein the transcoding device is configured to convert media content associated with the media signal from a third media format to a fourth media format to form the converted media information.

75. A system as defined in claim 73, wherein the transcoding device is configured to identify at least one of the first media format and the second media format prior to converting the extracted metadata.

76. A system as defined in claim 75, wherein the transcoding device is configured to identify a media format detectable by a metering device associated with the second media consumption device.

77. A system as defined in claim 76, wherein the transcoding device is configured to identify at least one of an audio watermark sensor, a video watermark sensor, a digital bitstream sensor, a database sensor, and a software sensor associated with the metering device.

78. A system as defined in claim 73, wherein the transcoding device is configured to detect a watermark associated with the media signal, to identify a signal compression ratio associated with the watermark, and to modify the signal compression ratio based on the second media format.

79. A system as defined in claim 78, wherein the transcoding device is configured to compare an output bit rate associated with the signal compression ratio to a system bit rate of the system and adjust the output bit rate based on the system bit rate.

80. A system as defined in claim 78, wherein the transcoding device is configured to change an output bit rate based on a network bit rate associated with the network.

81. A system as defined in claim 73, wherein the transcoding device is configured to generate a watermark based on the second media format and insert the watermark in the converted media information.

82. A system as defined in claim 81, wherein the transcoding device is configured to provide correlation information associated with the watermark and the converted media information to at least one of a data measurement collection device and a data collection facility.

83. A system as defined in claim 73, wherein the transcoding device is configured to encode the extracted metadata in the second media format and digitally insert encoded metadata into a bitstream associated with the converted media information.

84. A system as defined in claim 73, wherein the converted media information causes converted media content to be stored in a database.

85. A system as defined in claim 73, wherein the converted media information causes converted metadata to be extracted from the second media consumption device based on an application program interface associated with the second media consumption device.

86. A system as defined in claim 73, wherein at least one of the first media consumption device and the metering device is configured to extract the metadata from the media signal.

87. A system as defined in claim 73, wherein the transcoding device is configured to generate a converted media signal having the converted media information, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

88. A system as defined in claim 73, wherein the transcoding device is configured to transmit a converted media signal having the converted media information to at least one of the second media consumption device and the metering device, and wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

89. A system as defined in claim 73, wherein the metering device is configured to monitor media consumption based on the converted media information.

90. A system as defined in claim 73, wherein the metadata comprises at least one of content identification information, source identification information, destination

device identification information, distribution channel identification information, timestamps associated with at least one of creation and generation of media content, and information associated with the media signal.

91. A system as defined in claim 90, wherein the information associated with the media signal comprises at least one of frequency information, format information, signal strength information, bit rate information, frame rate information, and sampling frequency information.

92. A system as defined in claim 73, wherein the transcoding device is coupled to at least one of the first media consumption device, the second media consumption device, and the metering device via at least one of a wired network and a wireless network.

93. A system as defined in claim 73, wherein at least one of the first media consumption device and the second media consumption device is one of a television, a radio, a personal computer, a personal digital assistant, a telephone, a digital video disk player, and a personal video recorder.

94. A system as defined in claim 73, wherein the transcoding device is integrated with at least one of the first media consumption device, the second media consumption device, and the metering device.

95. A system as defined in claim 73, wherein the metering device is integrated with at least one of the first media consumption device and the second media consumption device.

96. A system as defined in claim 73 further comprising a server, a database, and a data measurement collection device.

97. A system as defined in claim 73 integrated with a home network.

98. An apparatus for transcoding a media signal comprising:
means for extracting metadata from the media signal to form the extracted metadata; and
means for converting the extracted metadata from a first media format associated with a first media consumption device to a second media format associated with a second media consumption device to form converted media information, wherein the first media consumption device and the second media consumption device are configurable to be communicatively coupled to a network.

99. An apparatus as defined in claim 98, wherein the means for converting is configured to convert media content associated with the media signal from a third media format to a fourth media format to form the converted media information.

100. An apparatus as defined in claim 98, wherein the means for converting comprises means for identifying at least one of the first media format and the second media format prior to converting the extracted metadata.

101. An apparatus as defined in claim 100, wherein the means for identifying is configured to identify a media format detectable by a metering device associated with the second media consumption device.

102. An apparatus as defined in claim 101, wherein the means for identifying is configured to identify at least one of an audio watermark sensor, a video watermark sensor, a digital bitstream sensor, a database sensor, and a software sensor associated with the metering device.

103. An apparatus as defined in claim 98, wherein the means for converting comprises:

means for detecting a watermark associated with the media signal;

means for identifying a signal compression ratio associated with the watermark;

and

means for modifying the signal compression ratio based on the second media format.

104. An apparatus as defined in claim 103, wherein the means for modifying is configured to compare an output bit rate associated with the signal compression ratio to a network bit rate associated with the network.

105. An apparatus as defined in claim 103, wherein the means for modifying is configured to change an output bit rate based on a network bit rate associated with the network.

106. An apparatus as defined in claim 98, wherein the means for converting comprises:

means for generating a watermark based on the second media format; and
means for inserting the watermark in the converted media information.

107. An apparatus as defined in claim 106 further comprising means for providing correlation information associated with the watermark and the converted media information to at least one of a data measurement collection device and a data collection facility.

108. An apparatus as defined in claim 98, wherein the means for converting comprises:

means for encoding the metadata in the second media format; and
means for digitally inserting encoded metadata into a bitstream associated with the converted media information.

109. An apparatus as defined in claim 98, wherein the means for converting is configured to convert the metadata to cause converted media content to be stored in a database.

110. An apparatus as defined in claim 98, wherein the means for converting is configured to convert the metadata to cause converted metadata to be extracted from the second media consumption device based on an application program interface associated with the second media consumption device.

111. An apparatus as defined in claim 98 further comprising means for generating a converted media signal having the converted media information, wherein the converted media information includes at least one of converted media content and converted metadata associated with the converted media content.

112. An apparatus as defined in claim 98 further comprising means for transmitting a converted media signal having the converted media information to at least one of the second media consumption device and a metering device associated with the second consumption media device, wherein the converted media information includes at least one converted media content and converted metadata associated with the converted media content.

ABSTRACT

A transcoder is adapted perform transcoding of metadata to enable sharing and consumption of media content at dissimilar devices that are coupled to a home network. The transcoder, which is also coupled to the home network, is adapted to receive media content and metadata from a first media consumption device, to transcode the media content and metadata from a first format to second format, and to supply the transcoded media content and metadata to the second media consumption device in the second format. In one embodiment, the transcoder executes a method by which the transcoder obtains information about the sensing capabilities of a meter adapted to measure media at a media consumption device and subsequently uses that information to transcode the metadata into a format suitable for sensing by the meter.